

Spectroscopist of the Century

William F. Meggers

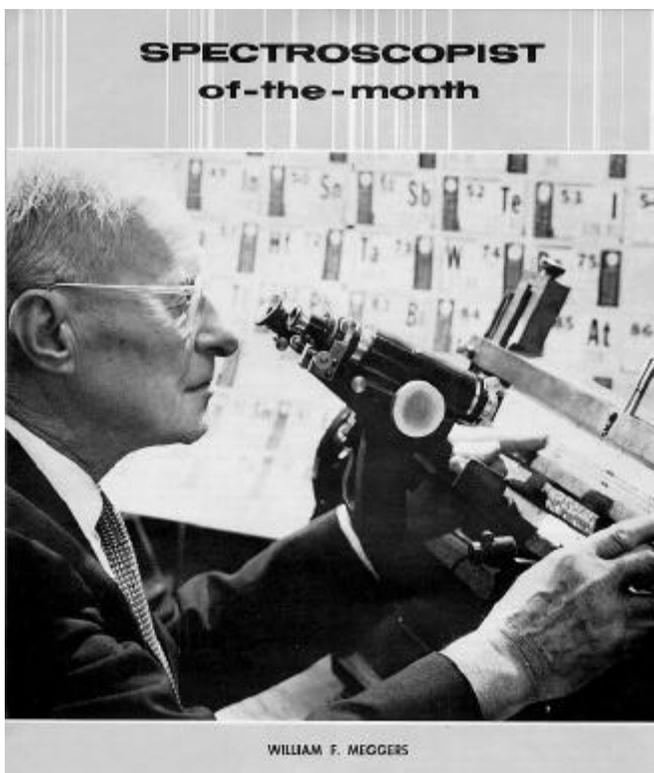
*This article was originally published in the October 1962 issue of **Arcs and Sparks** and titled "Spectroscopist of the Month – William F. Meggers." It is being reprinted on the 35th anniversary of that issue, which highlighted the 1st SAS National Conference. While no by-line was given, it is assumed to be the work of the editor, William G. Harkey.*

Arcs & Sparks proudly presents the story of "Bill" Meggers . . . who is thought of, by many, as the "dean" of American Spectroscopists!

Perhaps one of our greatest living demonstrations that Friday the 13th is not unlucky is William F. F. Meggers - one of the true pioneers of Spectroscopy. Flaunting superstition with utter disdain, William Frederick Ferdinand Meggers made his grand entrance on the stage of life Friday, July 13, 1888 and it has been one of the luckiest events in the history of our profession.

This man, one of the most appreciated for his extensive contribution to the science, was born to descendants of feudal German peasants who earlier immigrated to Wisconsin and became free farmers. At the age of six, William Meggers was sent to a Lutheran parochial school, but in an action foretelling his independence of thought, rebelled after two weeks of strict religious educa-

tion and was transferred to the Public School system. All during his early schooling, there was no "easy life" for Bill Meggers all his spare time was taken up with the chores and other essential farming duties. However, he has never regretted this basic education about foods and animals for it has been most helpful. Claiming that it was not the result of his innate brilliance, but simply by dint of study, he graduated as valedictorian of his high school class in 1906 and received a tuition scholarship to Ripon College.



His college days became the greatest challenge in his unfolding life, for Bill Meggers was long on ability and ambition but mighty short on money. He tucked the scholarship under his arm, picked up any odd jobs he could manage, organized a dance orchestra in which he was a triple-threat man (violin, trumpet and slide trombone), and earned the necessary money to get through school. In fact, William F.

F. Meggers was the first of numerous kinsfolk to acquire a college diploma. While like many mothers, William's had hoped that he would study medicine or law and end up with what, at the time was considered a position enjoying the greatest prestige on the American scene but her son had developed other ideas, a practice, incidentally, he was to continue throughout his entire life.

At Ripon College, Professor William H. Barber, who taught Physics there from 1906 to 1946, had a profound effect on our young student. Through his inspiring teaching, Bill Meggers majored in Physics, received a Bachelor's degree in 1910, and spent the following year as Professor Barber's first graduate assistant. The following year was a real rough one as he slaved as a graduate student and laboratory assistant at the renowned University of Wisconsin but he earned much needed credits toward a Master's degree. About this time, his money problems again weighed heavily upon him so he became an instructor in Physics at the then recently founded Carnegie Institute of Technology at Pittsburgh.

During his second year at Carnegie Institute he happened to read a paper which changed the whole course of his professional life. Authored by Niels Bohr, it was titled "On The Constitution of Atoms and Molecules", and proposed some novel postulates to explain spectra. It was only a short time after this that Bill Meggers went down to the Pittsburgh Post Office and spent two days writing a Civil Service examination. As the pattern of his life began to unfold in distinct





“MUSEUM DIRECTOR” MEGGERS is shown here in a corner of his private museum inspecting some milestones in civilization’s progress. The hundreds of collected items are neatly arranged and displayed in most attractive fashion. If it keeps growing they probably will have to build an addition to the house.

red finally led to a new octane in photographic observations that all enjoy today. His experimental results on refractive indexes of air (published with C. G. Peters in 1918) served a third of a century for the derivation of vacuum wave numbers from wavelengths measured in standard air; they were replaced in 1960 by a "Table of Wave Numbers" (with C. D. Coleman and W. R. Boxman) which is expected to last another generation—if not longer.

form, he received an appointment as Laboratory Assistant to the late Kelvin Burns, who was at the time the sole spectroscopist at the National Bureau of Standards, Washington, D. C. At the NBS, from 1914 to the present time Bill Meggers has persistently followed a plan of long-range systematic research in optical spectroscopy, including improvements in standard wavelengths, accurate descriptions of atomic spectra, their application to identification and determination of chemical elements, measurement of spectral line intensities, and other interrelated studies.

red-sensitized emulsions for photography from airplanes, other pioneer spectrochemical analyses, measuring many indexes of refraction of the atmosphere all of this while earning a Ph.D. from the Johns Hopkins University.

Additionally, he was a pioneer in spectrochemistry in the new world, demonstrating its usefulness in the Department of Commerce for the analysis of metals and alloys to the Treasury Department for testing proof gold and to the Department of Justice for detecting crime. A paper on "Practical Spectrographic Analysis" published in 1922 (with C. C. Kiess and F. J. Stimson) is generally credited with reviving interest in chemical spectroscopy in which some 3,000 United States Laboratories are presently engaged. Also, many years of service to Chemical Abstracts led to publication of "An Index To The Literature On Spectrochemical Analysis" (with Bourdon F. Scribner).

During World War 1, Meggers continued both his professional and educational progress at accelerated rates. Some of his important projects covered the measuring of standard wavelengths with interferometers, photographing spectra beyond visible red, demonstration of the use of

As an active member of the International Astronomical Union's Commission on Standard wavelengths during the past 40 years, he was the main contributor to secondary standards of wavelength from an iron arc measured relative to the primary standard (red radiation from cadmium). Since 1947, he provided an improved primary standard (Meggers Mercury 198 Lamp) and superior secondary standards emitted by an electrodeless lamp containing thorium iodide (with R. W. Stanley).

Meggers' early efforts to extend spectrographic records toward infra-

But, Meggers was constantly concerned about the poor quality of spectroscopic data (wavelengths, intensities, atomic energy origin) and the empiricism in suggested

LOOKS LIKE AN ARSENAL but it’s simply one corner of the museum where Bill Meggers enjoyably has displayed a magnificent gun collection. All indexed and described, this is one of the high spots in the Meggers museum --appreciated especially by men visitors.



MUSEUM'S "ASSISTANT DIRECTOR", Mrs. Meggers, takes great pains to keep everything shipshape. For our money, Bill has the easy job – collecting Mrs. Meggers has the tough task – making sure everything is always up to par. What's that about "woman's work is never done!"



methods of spectrochemical analysis. Thus simultaneously with the improvement in standard wavelengths, he tried to provide better descriptions of atomic and ionic spectra, especially of newly discovered concentrated, or artificial elements such as hafnium, rhenium, technetium, promethium, thulium, ytterbium, lutetium, actinium and the like. Since 1922, great effort has been spent on deriving atomic energy levels from structural analyses of optical spectra, culminating in the publication of three volumes of "Atomic Energy Levels" critically compiled by Charlotte E. Moore.

Finally, it became imperative to this man to make a wholesale calibration of discrete radiant powers which nearly 30 years later led to the publication of "Tables of Spectral-Line Intensities" (with C. H. Corliss and B. F. Scribner) that, for the first time, presented measured intensities of 39,000 lines (2000 Å° to 9000 Å°) observed in direct-current arcs exciting each of 70 metals when diluted 1000 fold in copper. In addition to calibrated intensity and spectral number, the authors hoped to give the energy levels responsible for each spectral line so that these tables would be most useful for trace analysis and for greater accuracy in quantitative determinations by selecting homologous pairs of analysis and internal-standard lines with similar excitation charac-

teristics. Unfortunately, the energy levels for 14,000 strong lines (mostly from rare earth elements) are still unknown, so William Meggers has dedicated the rest of his life to seeking more of these.

This scientific-oriented life has not been without its awards both numerous and of highest nature. Only in the past few years, for instance, the Optical Society made him an Honorary Member and in 1947 awarded him the Ives Medal the U. S. Department of Commerce bestowed upon him, in 1948, the Exceptional Service Gold Medal the Franklin Institute gave the Eliot Cresson Medal the New York Section of the SAS made the first award of its annual medal to him and, in 1954, the National Academy of Science elected him into membership. These are the marks of devotion to cause, meticulous and laborious work, brilliance of creative concept that have given William Meggers greater satisfaction than any amount of money could buy.

If you ask this great man what he enjoys most, he probably would say, "Why, that's easy it's the fun of contributing to the advancement of spectroscopy". The "dean" of spectroscopists, together with his thoroughly charming wife and three children, has enjoyed many hobbies. One of the most prized, and enjoyed, is his participation in musical

offerings on either the violin, trumpet, or slide trombone, which never cease to bring back fond memories of his frugal years at Ripon College. To diversify, he thoroughly enjoys collecting rocks, minerals, relics of the Stone Age, and has quite an imposing array. To witness the extent of Bill Meggers' avocations, in 1942 the Meggers family dedicated a private museum of Science and Civilization which he maintains in his comfortable home. A "seventh heaven" to the collector's heart, the museum is now filled with hundreds of historical pieces including lamps, cameras, stereoscopes, typewriters, telephones, patent models, music boxes, phonographs, records, radios, historical movie films, and scores of other items that bring joy to the hearts of all its visitors.

Of the many "greats" in spectroscopy, none has given Arcs & Sparks more of a privilege to feature. We feel that William F. F. Meggers is a truly successful man, a whole man, a man whose constructive approach to life is reflected in his own philosophical reply, "Whatever my achievements and accumulations, they are but symbols of the joy of living in this age of extraordinary progress in science, technology, and culture". We humbly, and proudly salute WILLIAM F. F. MEGGERS Spectroscopist Extraordinary!

